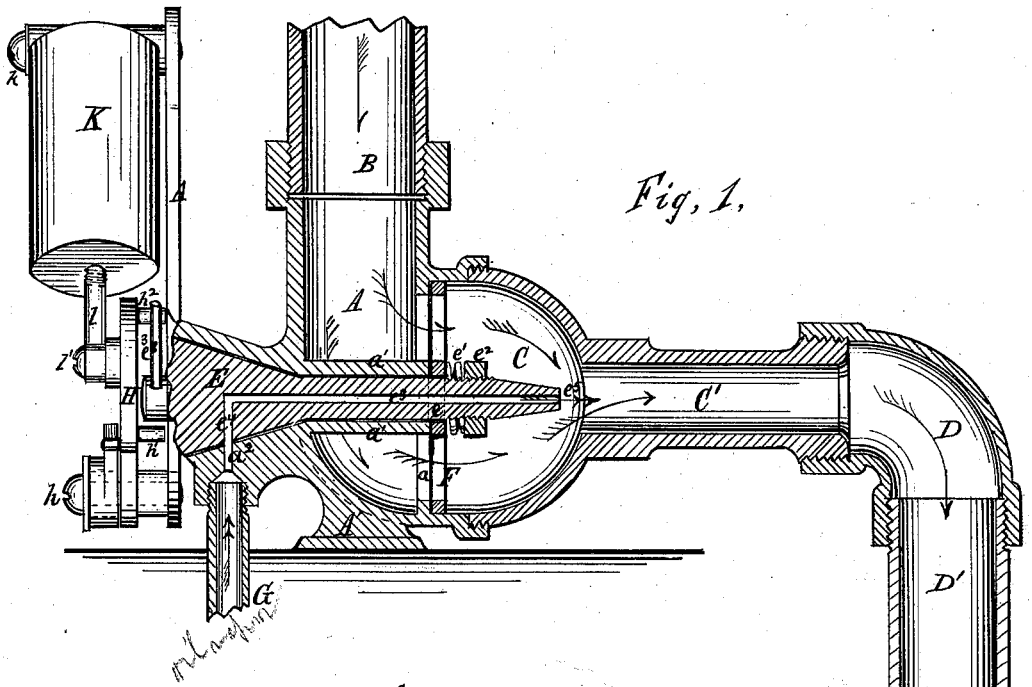
L. D. TOWSLEY.

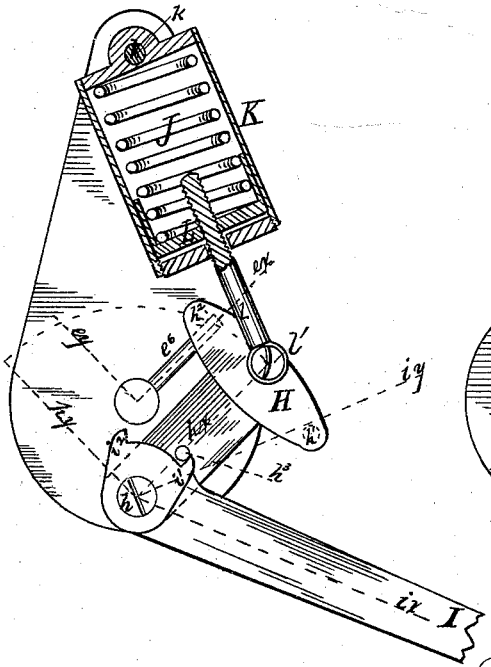
Automatic Mixing-Valve for Gas-Machines.

No. 165,188. Patented July 6, 1875.

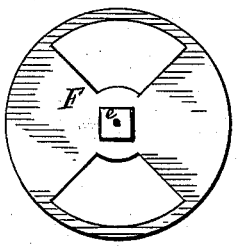
Fig, 1.



Fig, 2.



Fig, 3.



Inventor
L. D. Towsley
per T. Van Kannel
Atty.

Attest
A. V. Stewart
Le. Prehn

N. PETERS, PHOTO-LITHOGRAPHER, WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

LOVIAS D. TOWSLEY, OF CINCINNATI, OHIO.

IMPROVEMENT IN AUTOMATIC MIXING-VALVES FOR GAS-MACHINES.

Specification forming part of Letters Patent No. **165,188**, dated July 6, 1875; application filed May 4, 1875.

To all whom it may concern:

Be it known that I, LOVIAS D. TOWSLEY, of Cincinnati, county of Hamilton and State of Ohio, have invented a new and improved Automatic Mixing-Valve for Gas-Machines; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the annexed drawing, making a part of this specification, wherein—

Figure 1 is a vertical longitudinal section, Fig. 2 is a front elevation of the mechanism for operating the valve, and Fig. 3 is the cut-off for the air-valve, detached.

Similar letters of reference indicate like parts.

The nature of my invention relates to that class of gas-machines in which hydrocarbons are brought to a vapor under pressure and then mixed with atmospheric air to form illuminating-gas. It consists mainly in a double valve, one portion admitting oil-vapor and the other air. It further consists in a device whereby the valve is opened or closed instantaneously, receiving its motion from that of any suitable reciprocating part of the machine, such as the gas-holder, &c.

In construction my invention is as follows: A is the main part of the structure, being enlarged below and changing its cavity from a vertical to a horizontal direction. Above, it receives the air-pipe B. C is the mixing-bulb, which continues on horizontally in a small straight cylinder, C′, to which is screwed the elbow D and pipe D′, carrying the gas, as previously mixed, to the gas-holder. The part A′ rests on the retort, from which it receives sufficient heat to prevent its clogging. The part A has placed within it a vertical diaphragm, *a*, having two segmental openings at an equal distance apart, and formed like the valve shown in Fig. 3. At a^1 is cast a cylindrical neck, extending back, where it terminates in a cone, which receives the key E. This key extends forward where it is provided with a square neck, *e*, to receive the air-valve F, better shown in Fig. 3. This valve has two openings corresponding to those in the diaphragm *a*, to which it has been ground air-tight. A spring, e^1, held on by nut e^2, serves to hold valve F to its place, and also to hold the conical key E in position, and taking up the wear in both. The key extends forward some distance, to within a short distance from the mouth of cylinder C′, and is provided with a small bore, e^3, running longitudinally until it arrives at e^4, where it changes to a right angle so as to coincide with opening a^2, which receives the tube G, supplying pure oil-vapor from a retort not shown in the drawing. The bore, e^3, is narrower at its outlet at e^5, to increase the force of jet. The mechanism for operating the valve begins at the key E, which receives a pin, e^6. In Fig. 2 is shown the position of pin e^6 when the vapor and also the air-valves are open. When closed, the pin e^6 will stand at the dotted line *e y*. At H is a vibrating arm having its fulcrum at the screw *h*, and is provided with two projections, *h* and h^2, which engage with pin e^6; also a projection, h^3, which engages with prongs i^1 and i^2 of the short arm of lever I. This lever also has its fulcrum at *h*, but is slipped over the hub of arm H, and its long arm extends some distance from where it is represented as broken off, where it is attached to the gas-holder. A coil-spring, J, housed within the cylinder K, acts against a plunger, L, which has an adjustable connecting-rod, *l*, extending to and joined to arm H by a screw, l^1, permitting the two parts to flex. The cylinder K is pivoted at *k*, to keep it in position and allow a lateral vibrating motion, corresponding to that of part H.

From the above, the operation of my invention becomes obvious. The arrows of a single barb show the course of the air; those of four barbs, the course of the oil-vapor; and those of two barbs show the course of the gas after mixture. The cut-off F in the drawing is represented to have its two openings over the corresponding openings of diaphragm *a*, permitting a free passage of air, and the opening e^3 and e^4 communicating with that of a^2, allowing the flow of oil-vapor through tube G. As the vapor comes from the key E in a jet, it draws in and mixes a certain proportion of air therewith. The force with which the vapor, under compression, emerges from key E, owing to its construction above described, gives sufficient force of gas through tube D′, leading into the gas-holder, to elevate

it to its uppermost point. In this upward movement it takes with it the lever I, from the line ix to that of iy. During this movement the prong i^1, by its engagement with pin h^3, has elevated the arm H from line $h\ x$ to a point a small distance beyond the perpendicular, having compressed the spring J and brought the cylinder K also to a vertical point. The projection h^1 now engages with the pin e^6. When the point l^1 has passed the straight line between fulcrums h and k, the force of the spring will, through the connecting-rod l, force the arm H down until it arrives at the dotted line $h\ y$, having in this movement brought pin e^6 from line $e\ x$ to $e\ y$, where the vapor-passages as well as the air-passages have been closed off. At this point the plunger L has come in contact with a head screwed into end of cylinder k, and forms the stopping-point for arm H, and also of pin e^6. This stopping-point may be varied to give greater or less movement to key E, by turning the connecting-rod l in plunger L. Whatever back-action there may be in the gas from the weight of the gas-holder will further tend to hold the air-valve against its seat, thus forming a check-valve. Both vapor and air now being closed off, the gas-holder descends as the gas is withdrawn for use, moving the lever I downward until it arrives in line $i\ x$, the tooth i^2 having brought the arm H to a point a little beyond a perpendicular, when the action of the spring J forces the arm H to line $h\ x$, and by the engagement of projection h^2 with pin e^6 moves it from line $e\ y$ to $e\ x$, where the oil-vapor openings and air-openings all come respectively in line, when the gas-holder is again filled, as before mentioned.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The cylinder C, having diaphragm a and valve F, in combination with pipes a C^1, and oil-vapor supply mechanism, substantially as and for the purpose hereinbefore described and set forth.

2. The cylinder C, having diaphragm a and valve F, and air-supply pipe a, in combination with the valve-plug E, and the mechanism herein described for regulating the supply of gas, substantially as and for the purpose described and set forth.

3. The oil-vapor valve-plug E, having the bore e^3 e^4, and contracted nozzle e^5, in combination with oil-vapor supply-pipe, G, substantially as hereinbefore described and set forth.

4. The mechanism for operating and regulating the valve, composed of lever I connected with the gas-holder, the arm H having projections h^1 h^2 engaging the pin e^6, the connecting rod l and the spring J, substantially as hereinbefore described and set forth.

5. The combination of the adjustable connecting-rod l with the arm H, spring J, and piston L, substantially as hereinbefore described and set forth.

L. D. TOWSLEY.

Witnesses:
J. L. WARTMANN,
WM. H. SCHLATER.